Analysis of Endotoxin Samples:

The samples were sonicated in 5 ml of triethylamine phosphate (TAP) buffer for one hour, diluted serially and placed in a polystyrene microplate with control standards and blanks. LAL was then added to each well, the plates incubated at 37^{o} C and the absorbance at 405 nm was monitored every 30 seconds for 120 minutes. The concentration of endotoxin is proportional to the magnitude of the reaction and the color change. The standard and sample dilution curves were compared with an estimated parallel-line bioassay analysis to determine the assay validity.

Description of Wind Patterns and Recirculation Index:

During March through October, the predominant directions are northwest and west-northwest (flowing from the greater San Francisco Bay area up the San Joaquin Valley (SJV) through Fresno). During November through February, the wind blows from both the northwest and southeast in approximately equal measures. Cross valley winds (from the southwest or northeast) winds are infrequent.

The 12-hour recirculation factor was calculated as follows: given a 12-hour back-trajectory calculated from the First Street monitor, the recirculation factor = ((net distance from trajectory start point to end point)/(length of trajectory path)) (Allwine and Whiteman 1994).

Spatial Mapping:

When measurement data were available from one or more sites located within 0.50 km of a grid point, the measured concentration (or average of measured concentrations) was assigned to the grid point. If no measurements data were available within 0.50 km of a grid point, the concentration was estimated by inverse distance squared weighting of the six nearest sites with data that were within 50 km of the grid point. Concentrations at 12 points equally spaced along the domain boundary were assigned the harmonic mean of the daily measured concentrations and used in the interpolation as valid measurement sites.

Endotoxin Seasonality

Ambient endotoxin is found primarily in the course particle ($PM_{10\text{-}2.5}$) fraction of particulate matter. The principal source of $PM_{10\text{-}2.5}$ is resuspended dust. Resuspended dust emissions are much greater from dry surfaces than wet surfaces. Course PM and endotoxin are low during raining season due to low resuspended dust emissions from the wet surfaces, and a high during the warm, dry season when soil dust is easily resuspended from dry disturbed agricultural surfaces.

Coefficient of Divergence:

$$\overline{COD_{ab}} = \sqrt{\frac{1}{ndays}\sum_{i=1}^{ndays}\left(\frac{C_{ia}-C_{ib}}{C_{ia}+C_{ib}}\right)^2}$$

(Eq. 1) where C_{ia} and C_{ib} are the concentrations at stations "a" and "b" on the i^{th} day, respectively. COD=coefficient of divergence

$$\overline{CV} = \frac{1}{ndays}\sum_{i=1}^{ndays} CV_i$$

(**Eq 2)** where CV_i is the coefficient of variation of the concentrations measured at all locations on the i^{th} day.

ndays=number of days with measurements

Regressions for CAFO, Pasture and Cropland:

Dependent variable is 22-day summer average endotoxin (EU/m3) at FACES residences and school sampling locations

Independent Variable	Slope	Intercept	R2
Area of CAFO within 20 km radius (km2)	0.0876	4.76	0.41
Area of CAFO within 10 km radius (km2)	0.4375	4.90	0.44
Area of Pasture Land within 20 km radius (km2)	0.017	4.28	0.41
Area of Pasture Land within 10 km radius (km2)	0.023	4.91	0.10
Area of Cropland within 20 km radius (km2)	0.0012	4.43	0.36
Area of Cropland within 10 km radius (km2)	0.0033	4.81	0.27

Average summer endotoxin was negatively associated with area of grassland, forest, parks, and schools within the same 10km and 20 km radius buffers

These regression were not used for the spatial mapping.

Table S1. Results regressions of daily endotoxin concentrations at the First Street and Fremont sites on concentrations outdoors at schools, and outdoors at residences in Fresno.

Independent Site	Dependent Site	Season	Slope	Intercept	N	R^2	COD[a]
First Street	Bullard Talent	Dry	0.86**	0.50	35	0.45	0.19
First Street	Burroughs	All	0.92**	0.44	36	0.80	0.15
First Street	Burroughs	Cool/rainy	0.91**	0.09	11	0.94	0.14
First Street	Burroughs	Dry	0.74**	1.39	25	0.55	0.15
First Street	Cole	All	1.31**	0.13	29	0.43	0.39
First Street	Cole	Cool/rainy	0.91*	0.17	18	0.38	0.38
First Street	Cole	Dry	2.42*	-0.08	11	0.74	0.40
First Street	Copper Hills	Cool/rainy	0.59**	0.2	27	0.56	0.31
First Street	Easterby	Dry	0.44*	1.8	28	0.28	0.36
First Street	Forkner	Cool/rainy	0.67**	0.07	31	0.67	0.28
First Street	Fremont	All	1.03**	0.48	264	0.75	0.27
First Street	Fremont	Cool/rainy	1.14**	0.14	129	0.62	0.31
First Street	Fremont	Dry	0.87**	1.34	135	0.57	0.23
First Street	Holland	Cool/rainy	0.57*	0.39	31	0.26	0.26
First Street	Miramonte	Dry	0.90**	0.39	37	0.56	0.18
First Street	Viking	Dry	0.69**	1.35	57	0.51	0.17
First Street	Individual Residences	All	0.98*	0.72	320	0.55	#
First Street	Individual Residences	Cool/rainy	0.79*	0.52	166	0.24	#
First Street	Individual Residences	Dry	0.77*	1.97	154	0.36	#
Fremont	Bullard Talent	Dry	0.43**	1.29	31	0.35	0.26
Fremont	Burroughs	All	0.83**	0.16	40	0.75	0.16
Fremont	Burroughs	Cool/rainy	0.69**	0.19	15	0.95	0.15
Fremont	Burroughs	Dry	0.77**	0.62	25	0.42	0.17
Fremont	Cole	All	0.92**	-0.04	33	0.57	0.29
Fremont	Cole	Cool/rainy	0.60*	0.1	21	0.29	0.31
Fremont	Cole	Dry	1.19**	-0.15	12	0.86	0.25
Fremont	Copper Hills	Cool/rainy	0.29**	0.25	39	0.39	0.39
Fremont	Forkner	Cool/rainy	0.61**	0.08	33	0.85	0.27
Fremont	Holland	Cool/rainy	0.61**	0.21	35	0.38	0.26
Fremont	Viking	Dry	0.59**	1.24	62	0.51	0.19

[a] COD = coefficient of divergence; see methods for definition

* p <0.5 ** P<0.001 # insufficient data at individual residences and some schools for COD calculations.

Table S2: Model[a] for Endotoxin Concentrations on Day *t* at Fremont Site Based on Model Fit for First Street Monitor

Variable	Parameter Estimate (SE, p)
Intercept	4.4652
Endotoxin, day (*t-1*)[b]	0.3500 (0.1076, <0.002)
Endotoxin, day $(t\text{-}1)^3$	-0.0072 (0.0039, <0.065)
Mean Relative humidity, day (*t*)	-0.0506 (0.0250, <0.046)
Mean Relative humidity, day $(t)^2$	0.0003 (0.0015, <0.865)
12-hr Recirculation Index[c]	4.9971 (1.2541, <0.001)
Wind speed at 8 P.M., day (*t-1*)	- 0.0856 (0.1167, <0.465)
Wind speed at 8 P.M. day $(t\text{-}1)^2$	-0.0372 (0.0297, <0.215)

[a] Based on 120 data values of endotoxin concentrations at Fremont site from June 2002-October 2002, May 2003, and August 2003. Model uses Fremont site endotoxin concentrations with variable form from model in Table 2

R^2 for model= 0.52

[b] *t-1* is defined as the daily endotoxin concentration over the preceding 24 hours of a given 24 hour measurement

[c] Variable is the mean of six, 12-hour recirculation indices:

12 P.M-12 A.M of day *t-1*
4 P.M. (*t-1*) - 4 A.M. day *t*
8 P.M. day (*t-1*) 8 A.M. day *t*
12 A.M. – 12 P.M. day *t*
4 A.M. – 4 P.M. day *t*
8 A.M. – 8 P.M. day *t*

The greater the value, the greater the recirculation; therefore, the greater is the endotoxin concentration.

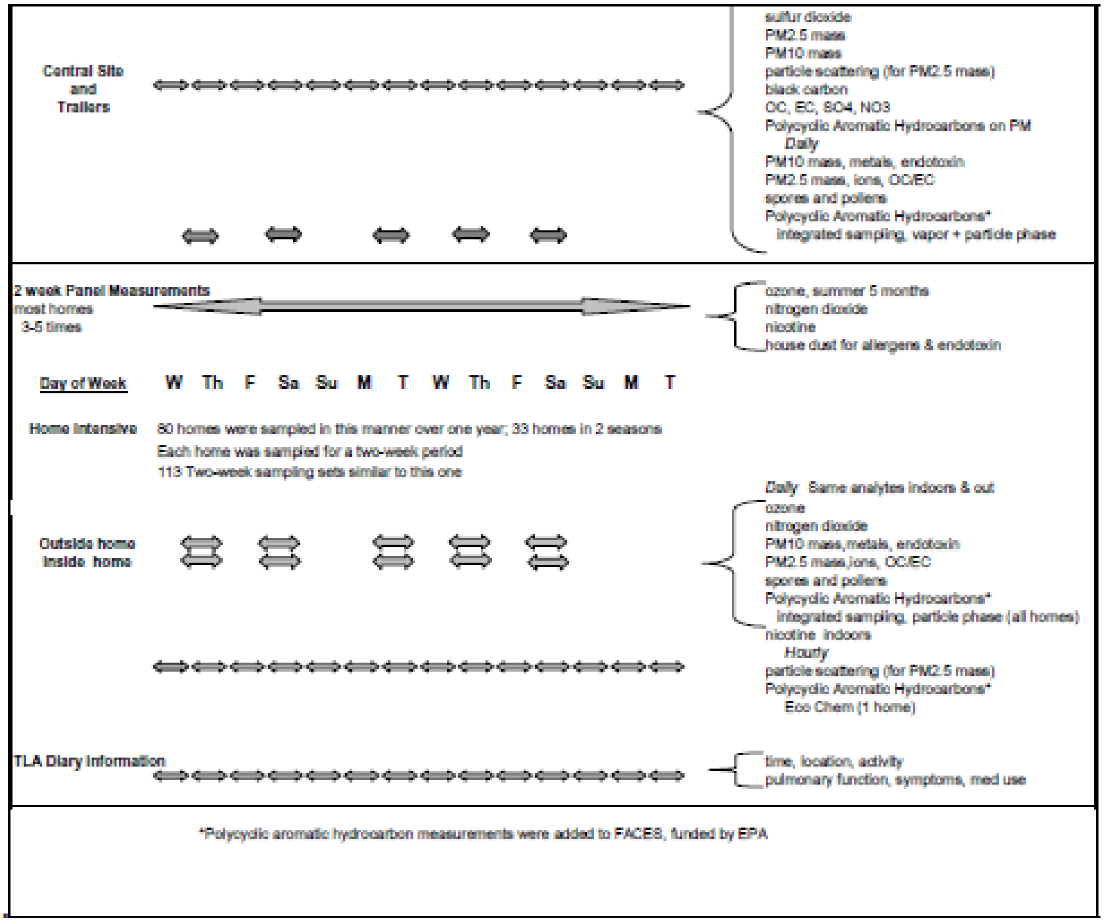

Figure S1: Time scale for sampling of air pollutants and biological agents during one home's two-week panel study. Arrows indicate the length of the samples (one day, for example)

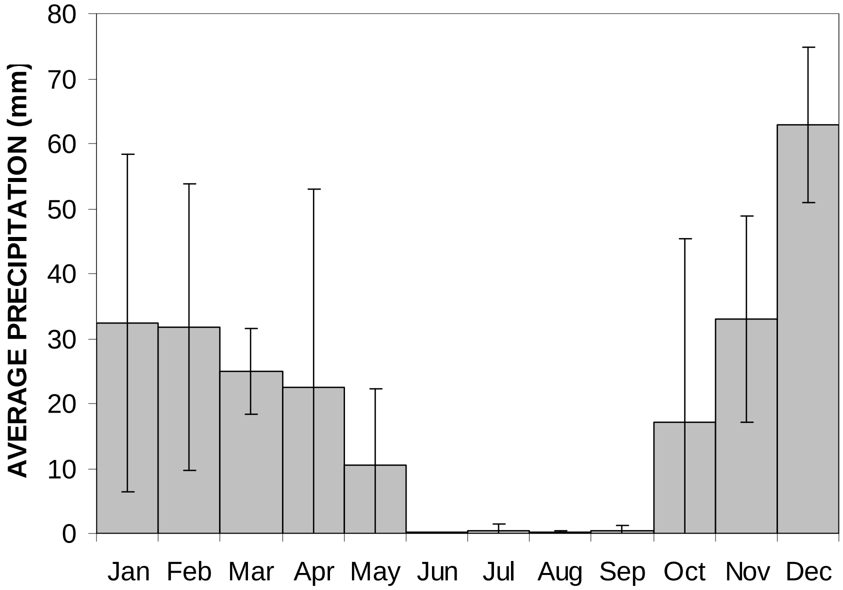

Figure S2. The height of the bars show the average of total rain fall by month from 2001 through 2004 in Fresno, CA. The lines are the standard deviations for those monthly means.

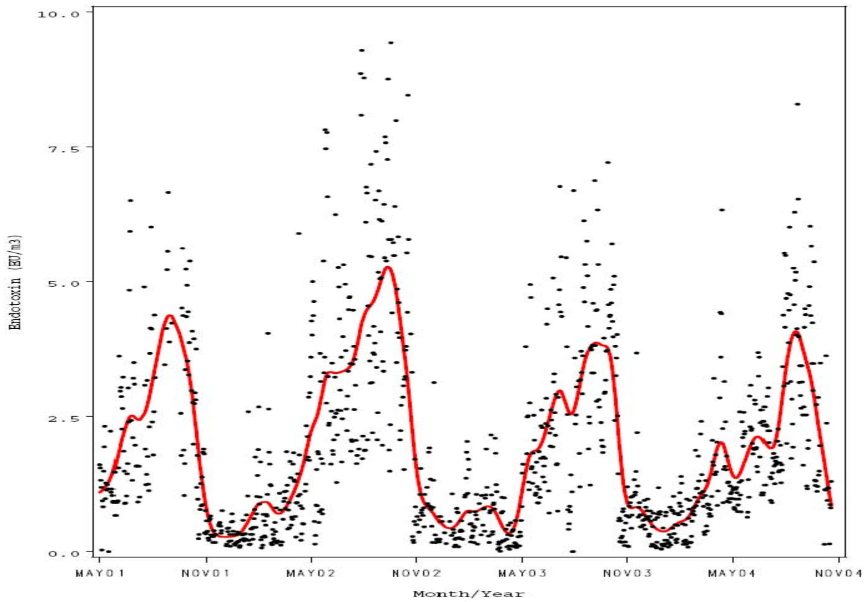

Figure S3: Time series of daily endotoxin concentrations at First Street, ARB monitoring site; May 13, 2001 through October 31, 2004. Red line represents a smoothing spline of daily endotoxin values.

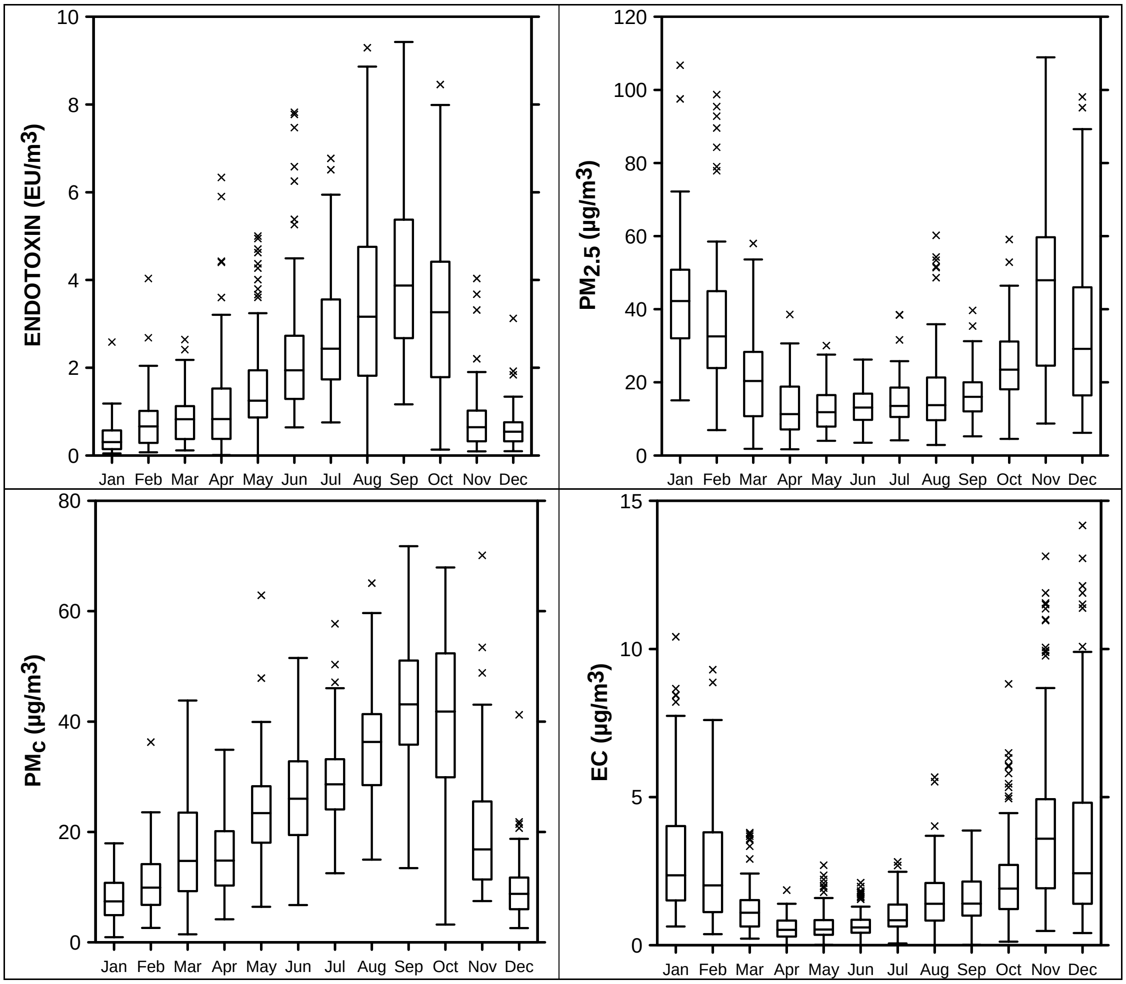

Figure S4: Box-whisper plot distributions of endotoxin, $PM_{2.5}$, PM_c, and $PM_{2.5}$ EC concentrations by month from May 13, 2001 through October 31, 2004.

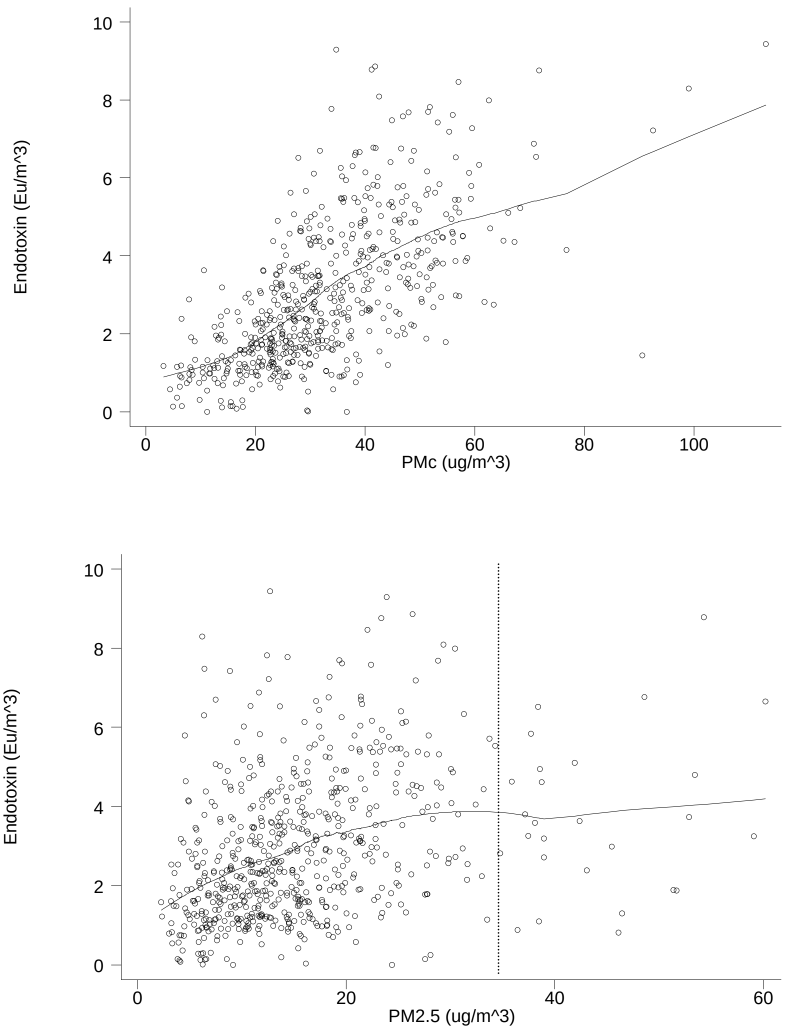

Figure S5. Endotoxin versus PMc (top) and $PM_{2.5}$ (bottom).

Regressions: Endotoxin = -0.205 + $0.113PM_{10\text{-}2.5}$ - $0.004(PM_c)^2$, r^2=0.44

Endotoxin = 1.157 + $0.152PM_{2.5}$ - $0.002(PM_{2.5})^2$, r^2=0.15

Vertical line on x-axis is the 35 $\mu g/m^3$, daily $PM_{2.5}$ NAAQS standard.

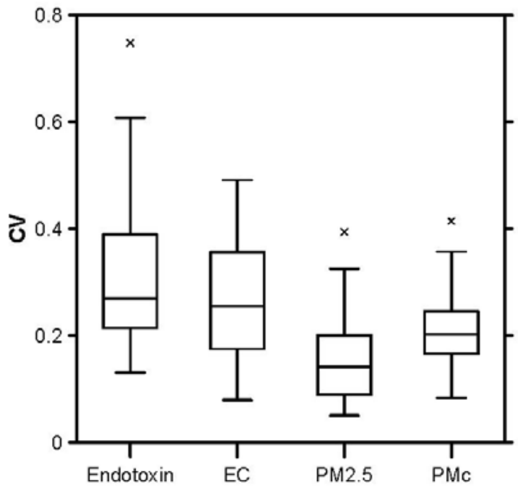

Figure S6. Box-whisker plots of the daily spatial coefficients of variation (CV) for endotoxin, elemental carbon (EC), PM_c, and $PM_{2.5}$ on the 22 dry season days with 6 or more endotoxin measurement locations

References

Allwine KJ, Whiteman CD. 1994. Sngle-station integral measures of atmospheric stagnation, re-circulation and centilation. Atmos Environ 28: 713-721.